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ABSTRACT

A study of 102 children who failed a preschool hearing screening was undertaken to describe the effectiveness of the followup procedures used in public health screening programs. Parents of the study children were interviewed to ascertain the parents' ability to understand the purpose of the testing and the technician's comments following the tests, and to initiate some action toward medical diagnosis or treatment of the hearing failure. Among findings were that 91% of the parents that sought followup care responded that the purpose of the test was for the identification of hearing loss, that 94% of parents responding understood that their children had failed the preschool hearing test, and that only eight followup visits by the public health nurse were made. Among recommendations were that technicians counsel parents more fully on the need for them to initiate action toward followup. Appendixes include letters, parental responses to interviews, and sample data. (PHR)

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HEARING SCREENING FOLLOW UP PROCEDURES TO FAILURES FOUND AMONG PRESCHOOL CHILDREN IN ST. CLAIR COUNTY, MICHIGAN, IN SPRING 1978: A DESCRIPTIVE STUDY OF THEIR EFFECTIVENESS

by

Raymond Philip Groh, Jr.

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Submitted in partial fulfillment of the requirements for the degree of Doctor of Education in The University of Sarasota

January 1980

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Abstract

A study was undertaken to describe the effectiveness of the public health hearing screening program that screened the preschool children in St. Clair County, Michigan, in the spring of 1978. The effectiveness was to be assessed by examining the actions taken, or not taken, by the parents of the children who failed the preschool hearing screening in 1978 in St. Clair County. This site was chosen for the study because of the maturity and success of the public health hearing screening program in that county, the manageable size for a study, and certain information which indicated that St. Clair County might be viewed as being an ideal public health environment for the operation of a hearing screening program in the State of Michigan.

Following a statement on delimitations and the definition of certain terms frequently used in public health hearing screening programs, a review of extant literature pertaining to the mass hearing screening of children was undertaken, that identified the existence of a void in health and medically related journals and texts for the subject areas of parents, public health, mass screening and attitude to health, or any combinations of these subject areas. To date, no role for parents in the follow up of mass public health

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screening programs has been established in the professional literature.

The parents or parent surrogates of 102 children were interviewed and their responses assessed. A triad of certain responses to questions was identified as a means to measuring the effectiveness of the follow up procedures used with parents of preschool children who have failed their hearing screening. The effectiveness of the preschool hearing screening program in St. Clair County in the spring of 1978 was determined to be 34.31%. The hypothesis was that the effectiveness of the follow up procedures used with parents depends upon the ability of parents to:

1. understand the purpose of the testing,
2. comprehend the technician's comments following the testing, and
3. initiate some action towards medical diagnosis or treatment of the hearing failure.

Parental responses to a questionnaire confirmed that most parents understood that the purpose of the preschool hearing screening program was to identify hearing problems. Most initiated some follow up medical procedures regardless of the existence or absence of medical insurance coverage. Most, however, did not understand the technician when she counselled them that their children,

having failed the hearing screening, needed to have parent-initiated follow up care. Many did not know of the routine hearing retest during the kindergarten year, much less the results of that screening.

Although the effectiveness of this public health mass screening program was only 35%, the author concludes that the influence motivating about 95% of the parents towards initiating some kind of follow up care was over 20 years of public health screening in this county, inculcating in the population of St. Clair County the concept of seeking follow up care when a health problem arises. Thus public health concepts have been converted into private health practice. The data found in this study confirmed that most parents interviewed play an informed role in the follow up care of their children.

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To my family, from whom I have taken time to complete this study, I owe more than words can express.

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I. Introduction to this Study

Introductory Background

In Michigan, Act 368 of the Public Acts of 1978, known commonly as the Public Health Code, provides the primary state statutory basis for health services in that state. In addition to laying out the broad powers of the Michigan Department of Public Health, the Code contains specific references to various services, including public health hearing screening programs. Parents or their surrogates are required to present evidence of completed hearing screening for each child registered for the first time for kindergarten or first grade, in Section 9307.

The enactment passed by the Michigan legislature (Act 278, Public Acts of 1949) mandated the development of local hearing screening programs "for the purpose of seeking out children who may have hearing impairment so they may secure proper and necessary care and attention." The routine screening of children before they enter school has been accomplished in a number of counties of Michigan for some years on a pilot or voluntary basis. Guidelines for the screening procedures as well as for the subsequent

diagnostic otology field clinics have been developed by the Hearing and Speech Section of the Michigan Department of Public Health and followed throughout this state by local health department and school programs.

The Need for this Study

Frequently the public health hearing consultants and technicians refer to the many variables in the screening programs with which they are associated. Examples of these variables are:

1. the ways of conveying to parents the information that their child has failed the hearing screening;
2. the attitudes of parents upon being informed of their child's hearing failure;
3. availability of local otologic care;
4. follow up by school district and county health departments; and
5. type of medical coverage available to the child.

Also, to be taken into consideration are the factors of mobility of the population and the reassignment of students within a school district. Because of variables such as these, the assessing of follow up procedures has

been difficult to undertake.

The Problem to be Studied

The research considers the question: How effective are the follow up procedures used in public health screening programs? By evaluating actions taken, or not taken, by the parents and health personnel of a discreet population of children who have failed routine hearing screening, it is hoped that the information obtained will assist in answering the question posed earlier. Such empirical information, hopefully, will be useful not only in the evaluation of existing programs but also in the planning for the revision and/or the expansion of mass hearing screening programs.

Site of Study

The location for this descriptive study was St. Clair County, Michigan. In a recent personal communication (Mallery, 1979), the Senior Planner of the St. Clair County Metropolitan Planning Commission provided demographic data (Appendix I) regarding the county's population. The four factors contributing to the selection of this site were:

1. the maturity of the public health hearing screening program;
2. the high proportion of children tested prior to entry into kindergarten;

3. the manageable number of children for use in this study; and
4. the possibility of viewing the public health environment in this county as being the ideal for the operation of a hearing screening program in the State of Michigan.

These points will be discussed further.

The St. Clair County Health Department has operated routine hearing screening tests in the public and non-public schools of the county for over 20 years. The screening of preschool children began about 15 years ago and is offered each spring to children who are expected to enroll in school for the first time in the following September. The first certified public health audiometric technician is still testing children's hearing. The certified public health audiometric technician performing most of the hearing screening has also had many years of service for the county health department. The coordinator of the preschool hearing program in the spring of 1978 was a certified public health audiometric technician, too.

Consistently, in recent years, over 90% of the September school entrants have had their hearing tested through the county health department in the previous spring. As the

Regional Audiology and Speech Pathology Consultant for the Michigan Department of Public Health, the author of this study reports on such statistics annually. To his knowledge, no other county health department in Michigan has so great a coverage.

The study was concerned with the children who failed the preschool hearing screening in the spring of 1978. This number was approximately 100 children. It was physically possible to study this entire group of children. Thus, the study sample has been both practicable and manageable.

St. Clair County can be seen as an ideal public health environment for the operation of a hearing screening program because of the following reasons: As already noted, the existing hearing screening program has been operating for over 20 years, with a continuity of staff and a consistently high level of coverage as reported annually in the statistics. An impact of this program has been the gradual and constant educating of the people of St. Clair County regarding the purpose and value of such a public health mass screening program. Many of the parents interviewed in this study remembered having been tested by the certified audiometric technician when they themselves were school children. Having grown up with the screening program, most young

parents today in St. Clair County accept and understand the program, making the public health environment ideal for the operation of such a hearing screening program.

These four factors, taken together, have led to the selection of St. Clair County, Michigan, for the site of this study.

Delimitations

The descriptive study did not intend to evaluate the public health screening programs operating in Michigan in terms of techniques and methods, pass-fail criteria, training and supervision of public health audiometric technicians or the role of the regional audiology and speech pathology consultants of the Michigan Department of Public Health. Nor has it attempted to evaluate or discuss the medical diagnosis, treatment and care of otologic problems. Also, it did not intend to evaluate the local administration of the hearing screening programs in any area other than that of follow up services.

Definitions

It is appropriate that some terms used in public health hearing screening programs and referred to in this study be defined.

Air Conduction - a term used to indicate the path

through the air in the external ear canal and across the middle ear by which sound travels to the inner ear. A hearing test given with earphones is called an "Air-conduction" hearing test.

Audiogram - a chart or graph of a listener's ability to hear, as measured with a pure-tone clinical audiometer.

Audiologist - a person who is trained in one or all areas of hearing, such as, clinical diagnostic testing, research, management and education of the deaf and hard of hearing.

Audiometry - the technique of measuring hearing. Measurements may be made of the auditory response to any of several auditory stimuli, but fixed-frequency pure-tones and speech sounds are most commonly used.

Bone Conduction - a term used to indicate the pathway through the bones by which sound reaches the inner ear.

Clinical Audiometer - a precision built electronic device that produces pure-tones of exacting frequencies, and known, carefully calibrated intensities, used for measuring a person's ability to hear.

Conductive hearing loss - an interference with mechanical transmission of sound energy from the exter-

nal ear into the inner ear; involves the external ear and/or the middle ear.

Decibel (dB) - the unit used in audiometry to express the level of hearing acuity.

Hearing Conservation - early identification, evaluation, treatment, rehabilitation of an individual who may possess a hearing, speech or language problem.

Hearing screening - rapid methods of determining which children have normal hearing; hearing screening procedures do not supply any information about children who do not pass the screening.

Mixed hearing loss - a hearing loss which has both a conductive and sensori-neural component.

Otologist - refers to the medical specialist who is concerned with the ear.

Preliminary Screening - an initial hearing test at selected frequencies and intensities, to determine an individual's need for a more critical evaluation of their hearing.

Sensorineural hearing loss - a dysfunction of the sensory or neural structures of the ear.

Technician - a person who has been trained to do just the mechanics of testing; but not interpret the results.

Threshold - the intensity of a stimulus that will just barely produce a sensation; in pure-tone audiometry, threshold is defined as the minimal hearing level at which an individual is able to respond to a tone at least 50% of the time.

Other terminology is found generally either in an unabridged dictionary or in the professional literature.

Summary

Although documented efforts have been made by Michigan's elected officials to legislate statutes to enable public health screening programs, including the testing of the hearing of children about to enter school for the first time, and despite the continuing efforts of public health department personnel to implement such mass programs, an evaluation of the effectiveness of these programs has not been undertaken routinely to assess the comprehension and understanding of these programs and their findings by the parents of children who do not successfully pass such hearing screening. It is at this point, when parents, or their surrogates, accept the findings and implement some follow up processes, that the effectiveness of such a mass screening program can be evaluated. This is the point where the

provision of public health methods are converted into private health measures. Unless parents understand that their child's hearing is outside normal limits, their personal actions towards the diagnosis, treatment and care of that child's hearing loss may lack direction. The study is an attempt to assess the effectiveness of the preschool hearing screening program in St. Clair County (Michigan) in terms of the ability of parents to comprehend the information given them regarding their child's hearing loss and motivation towards follow up actions.

II. Review of Related Literature

Method of Review

Attempts have been made to review the literature pertaining to the mass hearing screening of children, with a view to citing known involvement of parents in the follow up procedures with children who failed such screening. A "Medline Search" was made through the reference service of the Wayne State University's Shiffman Medical Library (Detroit, Michigan) of bibliographic citations stored in the computer banks of the National Library of Medicine's National Interactive Retrieval Service. The computerized search was made for any title of any article appearing in any journal in any language since 1969 on the following topics: hearing tests, evaluation studies, mass screening, follow up studies, experimental hearing tests, audiometry, public health nursing, social medicine, public health, experiments for diagnosing deafness or hearing disorders, child health services, follow up studies, attitude to health, and parents.

A review of the number of titles for these subjects for the triennial period since 1976 is representa-

tive of the amount of reference material available.

	Topic	Number of Titles
1.	Hearing tests	240
2.	Evaluation studies or mass screening	8651
3.	Hearing tests and evaluation studies or mass screening	29
4.	Follow up studies and hearing tests	12
5.	Titles in item 4, excluding titles in item 3	10
6.	Experimental hearing tests	949
7.	Experimental hearing tests and evaluation studies or mass screening	79
8.	Audiometry and evaluation studies or mass screening	42
9.	Titles in item 8, excluding titles in item 3	40
10.	Hearing tests and public health	1
11.	Hearing tests and public health nursing	0
12.	Hearing tests and social medicine	0
13.	Experiments for diagnosing deafness or hearing disorders	451
14.	Child health services and experiments for diagnosing deafness or hearing disorders	6

	Topic	Number of Titles
15.	Mass screening and experiments for diagnosing deafness or hearing disorders	26
16.	Titles in item 15, excluding titles in item 3	17
17.	Follow up studies and experiments for diagnosing deafness or hearing disorders	14
18.	Titles in item 17, excluding titles in item 15	10
19.	Experiments for diagnosing deafness or hearing disorders and attitude to health	0
20.	Hearing tests and attitudes to health	0
21.	Mass screening and attitude to health	8
22.	Child health services and hearing screening	5
23.	Attitude to health and public health nursing	1
24.	parents	0
25.	parents and attitude to health	0
26.	parents and mass screening	0

Hearing Screening Programs in the United States

The Michigan Hearing Conservation Program was described by Coulthard and Rayner in 1975. The five phases outlined were preliminary frequency screening,

pure-tone threshold evaluation, medical evaluation, otology clinic and follow up. An attempt to involve the family was noted in two phases: nurse contact with the family to encourage medical evaluation of children with significant hearing losses and the mailing of a summary letter to parents following a child's attendance at otology clinic. Follow up was left to the physician chosen by the parent. No further involvement of parents was cited.

In the training manual for public health audiometric technicians, prepared annually by the Hearing and Speech Section of the Michigan Department of Public Health, no instructions are specifically given to technicians regarding the methods of interpreting test results to parents, although they are considered responsible for "interpretation to parents of diagnosis, findings and recommendations" according to the section on "The Technician".

California's "Hearing Testing of School Children and Guide for Hearing Conservation Programs" (1962) made no reference to parental involvement. The national public health conference held in 1977 under the aegis of Ohio State University to discuss hearing screening of preschool

children makes no reference to parental involvement in its "Guidelines" Chapter VI: "How Shall Referral for Follow-up Care be Handled?"

A multi-agency approach to the hearing screening of preschool children was reported in Journal of the Tennessee Medical Association in 1978. In this small experimental program, the parents of the 30 children who failed the screening were counselled by a retired otologist. No report was published of further follow up efforts which might have involved the parents.

Wilson and Walton (1978), in describing public school audiometry, made no reference to parents or follow up. Brooks (1977) also made no reference to parents in his description of auditory screening.

Appeldoorn, Gibbons and Wootten (1972), in reporting on a mass screening program for children in an Illinois county, note that the parents of a child not successfully completing a hearing screening were "advised to seek professional examination and care" for the child. A report form was given to parents upon which they were to report the findings of the examination and forward them to the county office. The county health consultants were to use the compiled findings for

determining future needs such as counselling for parents. Unfortunately, no subsequent report was published on the effectiveness of this follow up program. Grady (1978) made no reference to parental role or involvement in Chicago's school hearing screening program. Kodman (1964) referred to the usefulness of parents in reporting suspected hearing losses, but did not expand his thoughts to include their role in follow up. Winter (1978), in discussing a preschool hearing screening program in Duluth, Minnesota, remarked that "even though parents are contacted about their child's problem, some ignore the advice, thus denying their child of medical help". Recognizing the separation between public and private health, she continued, "legally, the nurse cannot force the parents into action."

Hearing Screening Programs in Canada

Thores and Philion (1972) stated that in a preschool screening program on central Vancouver Island (British Columbia, Canada), the failure of children to meet standards after two years was "discussed with the parents and school teacher." No further follow up efforts were reported. Magian (1976), in reporting on a mobile hearing program in central rural Manitoba,

indicated that children who continued to show hearing problems after two screenings in two months' time "were brought to the attention of the local public health nurse, who contacted the parents and arranged for the child to be seen by the family physician if this had not been done." Lescouflair (1975), in discussing primary prevention of hearing losses, commented that "parents lack basic information on ear hygiene of children" and also that "it is up to parents and teachers to ferret out the symptoms (of hearing loss)" but suggested no ways of counselling or instructing parents.

Generalized Health Screening Programs

Three other articles regarding mass screening programs were reviewed. Smith (1978), in discussing her nursing field experiences in Tanzania; Houser et al (1977), in referring to a follow up study of persons identified as being diabetic; and Maravilla (1977), in reviewing the Medicaid screening program for children in northern Texas, did not indicate any parental involvement or role in the follow up of their children's health problems.

Screening for Diagnosis and Educational Placement of Deaf Children

The diagnostic mobile program for early identification of hearing impaired children in Northern Ontario, as cited by Mitchell and Boyden (1978), depended chiefly on public health departments for follow up with limited reference to parent involvement. Chevrie-Muller (1978) stated that "one of the problems of a mass screening programme in which there is a large number of false positives is whether to inform parents of the results and worry them unnecessarily".

Downs (1977) and Northern and Downs (1978) recommended parental involvement in the diagnosis and educational program of sensorineural deaf children. Miller and Polisar (1964) also felt that parent counselling was an important function of a center servicing children with permanent hearing losses. However, Schierbeek (1978), writing in the Netherlands, noted that "data supplied by the schools show that especially in the case of hard-of-hearing children, specific case-finding and guidance still have much to be desired."

Audiology References

A number of works in the professional literature regarding audiology and hearing screening methodology were reviewed. These included the American Speech and

Hearing Association's "Guidelines for Manual Pure-Tone Threshold Audiometry" (1977) and discussions by Bender (1966), Bergman (1966), Duffy (1964), Newby (1972) and Smith (1968). None of these works included any reference to follow up responsibilities of parents of children who do not pass audiometric testing.

Summary

An extensive review of journals and texts has been made for information regarding parents' roles in the follow up process to a public health hearing screening program for children. Very limited references have been found in the writings of the past decade, with more responsibility being put on nursing and medical personnel than upon parents. Should parents seek guidance from the literature regarding procedures to follow after their child has been identified as having a hearing loss, they would find advice limited to encouragement to take the child to a doctor and to do what the doctor recommends. The role, the rights and the responsibility of parents is not defined in the literature. A void exists in the subject areas of parents, public health, mass and hearing screening and attitude to health, or any combination of these subject areas.

III. Methods and Procedures Used in Study

The Purpose of the Study

The purpose of the study was to assess the effectiveness of the follow up procedures used with the parents or parent surrogates of children who failed the preschool hearing screening tests provided by the St. Clair County (Michigan) Health Department in the spring of 1978. The parents or parent surrogates of the approximately 100 children who failed the preschool screening have been interviewed. The study considered the following questions:

1. Does the effectiveness of the follow up of hearing loss depend on the ability of the parents to understand the purpose of the testing program?
2. Does the effectiveness of the follow up of hearing loss depend on the ability of the parents to comprehend the hearing technician's comments following the testing?
3. Does the effectiveness of the follow up of hearing loss depend on the ability of the parents to initiate some action towards

medical diagnosis and treatment?

If left to nature, it might have been that some of the children failing the preschool hearing test would pass the routine hearing test given the following year in kindergarten. Having noted in the review of the literature that a dearth of information exists regarding a role for parents in the follow up procedures for mass public health screening programs, such as the preschool hearing screening program in St. Clair County, Michigan, the author hoped that the present study would make its contribution in demonstrating that a relationship exists between the ability of parents or parent surrogates to be participants in the follow up procedures and their child's ability to pass the routine hearing test performed during the subsequent school year. By studying the parents' ability to understand the purpose of the testing program, to comprehend the hearing technician's comments following the preschool testing, and to initiate some action towards medical diagnosis and treatment, the researcher attempted to discover some positive relationship between these abilities and the child's passing the subsequent hearing test.

Methodology Used

Parents or guardians of the children participating in this research study were asked to sign the following release of information:

> I/we permit the release of pertinent information from this questionnaire and from the St. Clair County Health Department to be used by Mr. R. Philip Groh, Jr., in his doctoral research for The University of Sarasota.

This signed permission statement appeared at the bottom of the general information page for each child, which also included the child's name, parent or guardian's name, address and telephone. When the author received the parental permission, he interviewed the parents and/or their surrogates and researched their County Health Department records in order to answer these questions:

1. What did you understand was the purpose of the preschool hearing screening test?
   a. to identify hearing loss _____
   b. required for school admission _____
   c. other (specify) _____
2. Did you know your child failed the preschool hearing test?
   Yes _____ No _____

3. What did the hearing technician tell you?

_____

_____

4. Who did you talk to or see about it?

   a. private physician _____

   b. public health otology clinic _____

   c. nothing _____

   d. other (specify) _____

5. a. Did the school/public health nurse talk with you about the child's hearing loss?

   Yes _____ No _____ Don't Know _____

   b. What did she say? _____

   _____

6. a. Was the child's hearing tested in kindergarten?

   Yes _____ No _____ Don't Know _____

   b. What was the result? Passed _____

   Failed _____ Don't Know _____

7. What kind of medical coverage does the child have?

   a. Blue Cross/Blue Shield _____

   b. Other medical insurance _____

   c. Medicaid _____

d. Other (specify) _____

e. None _____

8. To which of Wechsler's occupational groups (Wechsler, 1974) does the Head of the Household belong?

a. professional and technical workers _____

b. managers, officials, proprietors, clerical workers and sales workers _____

c. craftsmen and foremen _____

d. operatives, service workers (including private household), farmers and farm managers _____

e. laborers, farm laborers and farm foremen _____

The first four questions were developed to meet the prime purpose of the study. The three additional questions may reveal influencing factors on the parents' ability to be participants in the follow up procedures. Answers to question 5 gave information regarding the influence of the school or public health nurse to initiate some action towards medical diagnosis and treatment. Question 6 helped measure the effectiveness of follow up by comparing the number of children in the study who

passed the school hearing test without subsequent medical diagnosis and treatment with the number of children in the study who passed the school hearing test having had subsequent medical diagnosis and treatment; a comparison of the parents' responses with health department records gave some indication of the reliability of the parents' accuracy in this matter. Responses to question 7 suggested the availability of medical coverage for each child. The final question was included for reference information only as no evaluation of the influence of occupation stratification is included in this study.

Analysis of Collected Data

The data collected were assembled into two groups: children for whom no parental follow up was provided (question 4c checked), and children for whom parental follow up was provided (4a or 4b checked). Review of information on the children who failed the preschool hearing screening in the spring of 1978 in St. Clair County revealed that over half attended the otology field clinics provided cooperatively by the Michigan Department of Public Health and the St. Clair County Health Department. Of the others, follow up for medical diagnosis and treatment may have been initiated

by their parents through private physicians or other services. The number that had no follow up services was the contrast group and was compared with those who received follow up services through the public health otology field clinic or through private physicians.

Each child's parents or parent surrogates were contacted. Following introductory explanation of the purpose of this study, their cooperation and permission was solicited. The parent who accompanied the child at the time of the preschool hearing screening test was the preferred respondent for the purpose of the study. All interviews were done in face-to-face contact, unless individual circumstances necessitated a telephone interview. Verbal permission was gained and noted on the general information page.

The answers for each of the questions were recorded on an appropriate form for each of the two groups. A descriptive single statement was prepared of the responses given by each group, question by question, in terms of the quantity of identical answers made for each question. As many responses were in terms of the opinions and personal observations of the parents, the study did not lend itself easily to statistical

analysis. However, the responses for each question were examined and a descriptive statement was prepared for each group of responses. Using the descriptive statements, inferences and recommendations were made.

Hypothesis

The general hypothesis of the study was that the effectiveness of the follow up procedures used with parents depends on the ability of the parents to understand the purpose of the testing program, to comprehend the technician's comments following the testing, and to initiate some action towards medical diagnosis or treatment of the child's hearing failure. The following sub-hypotheses were examined also:

1. that supportive counselling by the school or public health nurse will encourage the parents or parent surrogates to proceed with the follow up procedures;
2. that children whose parents or parent surrogates followed up the hearing failures with medical diagnoses and treatment were more likely to pass the routine school hearing test given during the 1978-1979 school year; that is, as a result of the follow up

procedures undertaken by the parents or parent surrogates, the children's hearing improved.

Summary

The parents or parent surrogates of approximately 100 children from St. Clair County, Michigan, who were tested as preschoolers in the spring of 1978, have been interviewed to ascertain what follow up procedures, if any, that they undertook following the child's failure to pass the routine hearing test provided by the St. Clair County Health Department. The parents were divided into two groups: those who undertook actions for medical diagnosis and treatment of the child's hearing failure and those who did not undertake any follow up procedures. Questions were asked regarding the parents' ability to understand the purpose of the hearing testing program, the ability also to comprehend the hearing technician's comments following the preschool testing, and, finally, the ability to initiate some action towards medical diagnosis and treatment. Summary descriptive statements follow for the answers of the two contrasting groups. Inferences and recommendations have been developed from the descriptive statements. It is hoped that the study has

created a better understanding and an identification of the effectiveness of follow up procedures used in one public health mass screening program.

IV. Findings of Study

Population Surveyed

The total number of completed interviews was 102. Personal contact was attempted with all families. The number of successful personal interviews was 81 with the remaining 21 being completed by telephone. An additional 11 could not be contacted either in person or by telephone, most reportedly having moved from their last known address. The contacts were made on 17 days in September and October 1979. The length of time for each interview varied somewhat, but the questionnaire could be completed within five minutes. The purpose of the study was well received by the parents interviewed. All were cooperative and gave their permission for the responses on their questionnaire to be used in the study.

Results of the Questionnaire

Following were the results of the questionnaire used with the parents of the 102 children in the study. A description of the responses and a discussion of same were presented for each of the eight questions of the questionnaire in turn. In the tabulation of the data, column C ("care") was used for responses of the parents who

sought medical intervention. Column NC ("no care") was used for responses of the parents who sought no medical intervention. Column T ("total") was used for the total responses of both the C and NC groups. Under each column the entry in parentheses was the percent that this particular entry represents in the entries of this specific column.

Findings and Discussion of Question 1

Question 1

What did you understand was the purpose of the preschool hearing screening tests?

		C	NC	T
	Number of respondents	97	5	102
a.	identification of hearing loss	88 (90.72%)	4 (80%)	92 (90.20%)
b.	required for school admission	4 (4.13%)	0	4 (3.92%)
c.	other (see below)	5 (5.15%)	1 (20%)	6 (5.88%)
	(total percent	100%	100%	100%)

Other responses for the C group regarding the purpose of screening were:

1.) to assess the child's maturation, coordination and ability to understand;

2.) to help the child get through school and to help his speech to develop;

3.) to be able to understand the teacher;

4.) to check if learning is up to par;

5.) parent doesn't know.

The other response for the NC group regarding the purpose of screening was:

1.) parent doesn't know.

The data showed that 90.72% of the C group, 80% of the NC group, and 90.20% of the total number of parents interviewed responded that the purpose of the preschool hearing screening test was for the identification of hearing loss. The same words were not used in all responses, but all indicated somehow the need for early identification of hearing loss and/or medical intervention as the reason behind the preschool hearing program. That so great a number of parents responded in this fashion was felt to be a positive attitude and was due in part to the fact already noted (page 4) that hearing screening tests in the public and non-public schools in St. Clair County have occurred routinely for over 20 years. Many parents expressed appreciation for the testing and the early identification of a hearing and/or otologic problem in their own child. Others, whose children had already been under medical care for ear problems, expressed appreciation

for the screening as it was a check up on their own child's ear health. The one respondent in the NC group who did not understand the purpose of the preschool hearing test may have also failed to realize the importance of follow up medical care for their child. To the 10 respondents who expressed the thought that the reason for the preschool hearing screening was to fulfill a requirement for school admission or some other opinion, the author in his role of Regional Audiology and Speech Pathology Consultant for the Michigan Department of Public Health provided information to inform them of the real purpose, that is, the early identification of hearing loss.

Findings and Discussion of Question 2

Question 2

Did you know your child failed the preschool hearing test?

	C	NC	T
Number of respondents	97	5	102
Yes	92 (94.85%)	4 (80%)	96 (94.12%)
No	5 (5.15%)	1 (20%)	6 (5.88%)
(total percent	100%	100%	100%)

The data showed that 94.85% of the C group and 94.12% of the total number of respondents knew that their

child had failed the preschool hearing screening test. With over 94% responding positively to this question, it can be said that the certified audiometric technicians were successful in communicating the information regarding the hearing losses of the children in the study. That one pair of parents did not realize that their child had failed the preschool hearing screening test may have been a factor in those parents' not seeking medical care for the child.

Findings and Discussion of Question 3

Question 3

What did the hearing technician tell you?

The responses to this question recorded at the time of the parental interview can be found in Appendix II. The responses were placed into the one of the following generalized answer that was closest to the parent's response:

	C	NC	T
Number of respondents	97	5	102
The technician said that:			
1.) the child will be retested	2 (2.06%)	1 (20%)	3 (2.94%)
2.) the child failed the hearing test	21 (21.65%)	0	21 (20.59%)

(continued)	C	NC	T
3.) maybe the child should see a doctor	11 (11.34%)	0	11 (10.78%)
4.) the child failed the hearing test and should be tested further	7 (7.22%)	0	7 (6.86%)
5.) the child failed the hearing test and should see a doctor	6 (6.18%)	0	6 (5.88%)
6.) there were problems in the testing situation and the child should be tested again later	3 (3.09%)	0	3 (2.94%)
7.) the child had a particular health problem that was affecting the hearing ability	7 (7.22%)	2 (40%)	9 (8.82%)
8.) the test confirmed a condition reported by the parents on the health history	14 (14.43%)	0	14 (13.73%)
9.) the child had not done well on the test	15 (15.47%)	0	15 (14.71%)
10.) other	4 (4.13%)	1 (20%)	5 (4.91%)
11.) (parent can't remember)	6 (6.18%)	1 (20%)	7 (6.86%)
12.) (parent doesn't know)	1 (1.03%)	0	1 (0.98%)
(total percent	100%	100%	100%)

The responses of the parents to this question were varied even when categorized into the generalized answers. Generalized answers 1 and 6 implied that someone else will do the retest without involvement of the parent. Generalized answer 2 showed that the parents were aware of the hearing failure without implying the need for any action by them. Generalized answers 3, 4 and 5 indicated an awareness by the parents of a hearing and/or medical problem that necessitated some action by them. Generalized answer 7 showed awareness by the parents of a physical condition that might have affected the hearing, without implying the need for any action by them. Generalized answer 8 reflected awareness by parents of a physical condition for which medical attention had already been sought. Generalized answers 9 through 12 were indications of several ways in which there was a lack of understanding by the parents of the information given them at the time their children failed the preschool hearing screening test. The parents making the generalized answers 3, 4, 5 and 8 implied an awareness of the need for them to provide some kind of follow up care for their children. There were 38 parents whose responses were placed in generalized answers 3, 4, 5 and 8, all of them in the C group; that

is, 100% of the parents who inferred an awareness of the need to provide some kind of follow up care as a result of what the technician said to them, did in fact provide for this need. Also, the data indicates that none of the parents of the NC group (i.e., parents who provided no follow up care for their children) indicated an awareness of a condition that necessitated any follow up care. Their five responses were placed in generalized answers 1, 7, 10 and 11. Undoubtedly, the failure to understand from the technician's comments that their child had failed his hearing test and further that some action was needed by them, led to their providing no care for their children.

Findings and Discussion of Question 4

Question 4

Who did you talk to or see about it?

		C	NC	T
	Number of respondents	97	5	102
a.	a private physician	61.5 (63.40%)	0	61.5 (60.29%)
b.	a public health otology clinic	35.5 (36.60%)	0	35.5 (34.80%)
c.	no one	0	5 (100%)	5 (4.91%)
d.	other	0	0	0
	(total percent	100%	100%	100%)

A further exposition of the responses of the C group was needed for clarity. The 97 respondents indicated that:

47 (48.45%)	talked to or saw a private physician
21 (21.65%)	sought help at the public health otology clinic
29 (29.90%)	did both
(100%	total percent)

In counting the responses of the 29 parents who took both actions, 14.5 points were added to both responses a. and b., accounting for the fraction in both numbers. It is an interesting fact that the parents of 97 children (that is, 95.10%) in this study of 102 children sought follow up care for their children through their private physician, the public health otology clinic, or both.

Findings and Discussion of Question 5

Question 5

Did the school/public health nurse talk with you about the child's hearing loss?

	C	NC	T
Number of respondents	97	5	102
A. 1.) Yes	8 (8.25%)	0	8 (7.84%)
2.) No	88 (90.72%)	5 (100%)	93 (91.18%)

(continued)	C	NC	T
3.) Don't know	1 (1.03%)	0	1 (0.98%)
(total percent	100%	100%	100%)

Although the review of the literature indicated a role for the public health nurse in the follow up of mass screening programs, only eight individual nurse visitations were recalled by the parents of the children who failed the preschool hearing screening program in St. Clair County, Michigan, in the spring of 1978. All contacts were made by public health nurses and none by school nurses. All eight contacts were with parents in the C group, in each case after the parents had already sought care for their children, and no nurse contacts were made with the five parents who provided no follow up care for their children. The author requested and received an order of priority in public health nursing fieldwork from the nursing director of the St. Clair County Health Department (Kerna, 1979), as an indication of the importance for and availability of nurse follow up for children who fail their preschool hearing screening. A copy of the private communication appears in Appendix IV and indicates that such follow up is in the fifth priority, together with follow up of all chronic diseases. It would appear that the likelihood of nurse follow up for children who fail their

preschool hearing screening in St. Clair County, Michigan, is very small. When asked what the public health nurses did during the eight instances when there was contact, the parents responded that in each instance she asked for a progress report regarding the child's otologic care. The responses recorded at the time of the parental interview for Question 5b may be found in Appendix III. It is a moot question whether the parents of the five children in the NC group would have been motivated to action had a nurse visited and counselled them.

Findings and Discussion of Question 6

Question 6a

Was the child's hearing tested in kindergarten?

	C	NC	T
Number of responses	97	5	102
a. 1.) Yes	70 (72.16%)	2 (40%)	72 (70.58%)
2.) No	11 (11.34%)	2 (40%)	13 (12.75%)
3.) I don't know	16 (16.5%)	1 (20%)	17 (16.67%)
(total percent	100%	100%	100%)

The data regarding the parental responses to this question indicated an awareness by 72.16% of the C group,

40% of the NC group and 70.58% of the total group of their child's having had a hearing retest during kindergarten. This contrasted with the records of the St. Clair County Health Department that verify that 100 of the 102 children (98.04%) in the study did have their hearing rescreened. The inference is that information about the retest was not received by the parents of 28 children. A break in communication has thus been identified.

Question 6b

What was the result (of the kindergarten retest)?

	C	NC	T
Number of respondents	86	3	89
b. 1.) The child passed	46 (53.48%)	2 (66.67%)	48 (53.93%)
2.) The child failed	20 (23.26%)	0	20 (22.47%)
3.) The parent doesn't know	20 (23.26%)	1 (33.33%)	21 (23.60%)
(total percent	100%	100%	100%)

The number of respondents for each column equaled the number who answered "yes" and "I don't know" to question 6a in the same column. Although a majority of the parents responded that their child had passed the retest, the data contrasted with the records of the St. Clair County Health Department which verified the following:

	C	NC	T
Number of children tested	95	5	100
Number of children passed	69 (72.63%)	4 (80%)	73 (73%)
Number of children failed	26 (27.37%)	1 (20%)	27 (27%)
(total percent	100%	100%	100%)

The data indicated that 72.63% of the children who failed their preschool hearing screening test and whose parents had provided follow up care passed their routine kindergarten retest. Among the 26 children who failed the kindergarten retest despite the medical follow up care provided by their parents, were three children with permanent sensorineural hearing losses, two with permanent conductive hearing losses and a number with chronic otologic conditions associated with asthma and allergies. Although four of the five children who received no follow up care passed their routine kindergarten retest, the total percent of children in this study who passed the routine kindergarten hearing retest is raised by the addition of the NC group data only 0.27% to the 73% level. The number of children who passed their routine kindergarten retest in all three columns was felt to be a large enough amount to be taken into consideration.

Findings and Discussion of Question 7

Question 7

What kind of medical coverage does the child have?

		C	NC	T
	Number of respondents	97	5	102
a.	Blue Cross/Blue Shield	45 (46.39%)	2 (40%)	47 (46.08%)
b.	other medical insurance	32 (32.99%)	1 (20%)	33 (32.35%)
c.	Medicaid	15 (15.47%)	2 (40%)	17 (16.67%)
d.	other	0	0	0
e.	none	5 (5.15%)	0	5 (4.90%)
	(total percent	100%	100%	100%)

The data collected from the responses to this question indicated that the availability of medical insurance did not ensure medical follow up to the children of the study. Of the children whose parents provided no follow up care, 100% had some form of medical coverage, while the parents of five children, despite the lack of coverage, did provide medical follow up care. The inference was that parents who were motivated to provide follow up care for their children would do so without regard for medical coverage.

Findings and Discussion of Question 8

Question 8

To which of Wechsler's occupational groups does the head of the house belong?

	C	NC	T
Number of respondents	97	5	102
a. professional and technical workers	10 (10.31%)	0	10 (9.81%)
b. proprietary and clerical workers	12 (12.37%)	0	12 (11.76%)
c. craftsmen and foremen	26 (26.80%)	2 (40%)	28 (27.45%)
d. operatives, farmers and housewives	32 (32.99%)	2 (40%)	34 (33.33%)
e. laborers	17 (17.53%)	1 (20%)	18 (17.65%)
(total percent	100%	100%	100%)

As indicated in the section regarding methodology (page 25), this question was included for reference information only with no evaluation of the influence of occupation stratification included in the study. It was noted, however, by the author during many interviews that both parents were employed. What influence, if any, this has had on the parental follow up to preschoolers' hearing losses is unknown and no attempt to assess such influence was made in the study.

Findings Regarding the Hypothesis

The general hypothesis of the study was that the effectiveness of the follow up procedures used with parents depends upon the ability of the parents to understand the purpose of the testing program, to comprehend the technician's comments following testing, and to initiate some action towards medical diagnosis or treatment. Data needed from the questionnaire were question 1 (regarding the purpose of the preschool hearing testing), question 3 (regarding parental memory of what was said by the technician at the time the child failed the preschool hearing test), and question 4 (regarding the actions taken by the parents following their being informed of their child's failing the preschool hearing screening test). Specifically, data were needed on the number who answered question 1 by saying the purpose was to identify hearing loss, who answered question 3 with one of the generalized answers inferring an awareness of the need to provide some kind of follow up care for their children and who answered question 4 by indicating they sought follow up care from a private physician, through the public health otology clinic or both. The data recorded as responses by the total group of 102 participating in the

study are as follows:

1a.	92	(90.20%)
3. generalized answers 3, 4, 5 and 8	38	(37%)
4a. and 4b.	97	(95.10%)

However, data collected from the parental responses to question 1a plus 3 (generalized answers 3, 4, 5 and 8) plus 4a and 4b showed that 35 parents made this combination of responses, representing 34.31% of the total group studied. To evaluate subhypothesis 1 (that supportive counselling by the school or public health nurse will encourage the parents to proceed with follow up procedures), it was necessary to ascertain how many of the 35 parents answered question 5a (regarding parental contact with nurses) affirmatively. The data showed this number to be three, which was 8.57% of the group of 35. However, in each case parental contact with the nurses succeeded the initiation of follow up procedures by the parents. To evaluate subhypothesis 2 (that as a result of the follow up procedures undertaken by the parents, the children were more likely to pass the routine hearing screening test in their kindergarten year, i.e., the 1978-1979 school year), a review of the records of the St. Clair County Health Department was made. Of the group of 35, 25 were verified as having passed their routine kindergarten retest; this is 71.43% of the group of 35.

On the basis of the data assessed, and the general hypothesis stated, the level of effectiveness of the St. Clair County Health Department's 1978 preschool hearing screening program was 34.31%. Subhypothesis 1 could not be supported, as the data showed parental contact by nurses to have been only 8.57% of the group. Subhypothesis 2, also, could not be supported, despite the data showing that 71.43% of the group of 35 whose actions supported the general hypothesis did pass the routine school hearing test in their kindergarten (1978-1979) school year, as it was noted that four of the NC group, that is 80%, also passed the same routine test.

Summary

Interviews, either in person or by telephone, were accomplished with the parents or parent surrogates of 102 children who failed their preschool hearing screening tests provided by certified public health audiometric technicians in St. Clair County, Michigan, in the spring of 1978. A questionnaire containing eight major questions was completed for each child. The answers to one question were used to separate the children whose parents provided follow up services subsequent to their failing the preschool hearing test from those whose parents provided none; the former group was designated the C ("care") group while the latter was designated the NC ("no care") group.

The data for the other seven questions were dichotomized between the two groups; totals for each question were also provided. The findings for each question were discussed and some inferences made.

Certain responses to three of the questions were identified as data to support the general hypothesis, with two others identified as each supporting one of the two subhypotheses. A summary of the findings with recommendations follows in the next chapter.

V. Summary and Conclusion

Review of Study

A study was undertaken to describe the effectiveness of the public health hearing screening program that screened the preschool children in St. Clair County, Michigan, in the spring of 1978. The effectiveness was to be assessed by examining the actions taken, or not taken, by the parents of the children who failed the preschool hearing screening in 1978 in St. Clair County. This site was chosen for the study because of the maturity and success of the public health hearing screening program in that county, the manageable size for a study, and certain demographic information which indicated that St. Clair County contains an urban-to-rural proportion similar to that for the state of Michigan and therefore may be considered a microcosm of the state.

Following a statement on delimitations and the definition of certain terms frequently used in public health hearing screening programs, a review of extant literature pertaining to the mass hearing screening of children was undertaken. The result was that a void was identified to exist in health and medically related jour-

nals and texts for the subject areas of parents, public health, mass screening and attitude to health, or any combinations of these subject areas. To date, no role for parents in the follow up of mass public health screening programs has been established in the professional literature.

The parents or parent surrogates of 102 children who failed their preschool hearing screening provided by the St. Clair County (Michigan) Health Department in the spring of 1978 were interviewed and their responses assessed in an attempt to answer the following questions:

1. Does the effectiveness of the follow up of hearing loss depend upon the ability of the parents to understand the purpose of the testing program?
2. Does the effectiveness of the follow up of hearing loss depend upon the ability of the parents to comprehend the hearing technician's comments following the testing?
3. Does the effectiveness of the follow up of hearing loss depend upon the ability of the parents to initiate some action towards medical diagnosis and treatment?

The general hypothesis of the study was that the effectiveness of the follow up procedures used with parents depends upon the ability of the parents to understand the purpose of the testing program, to comprehend the technician's comments following the testing, and to initiate some action towards medical diagnosis or treatment of the child's hearing failure. The following sub-hypotheses were examined also:

1. that supportive counselling by the school or public health nurse will encourage the parents or parent surrogates to proceed with the follow up procedures;
2. that children whose parents or parent surrogates followed up the hearing failures with medical diagnoses and treatment were more likely to pass the routine school hearing test given during the 1978-1979 school year; that is, as a result of the follow up procedures undertaken by the parents or parent surrogates, the children's hearing improved.

With these hypotheses in mind, the author assessed the parental responses to the questionnaire.

Summary of Findings

The data for question 1, regarding parental understanding of the purpose for the preschool hearing test, showed that 90.72% of the parental group that sought follow up care for their children, 80% of the parental group that sought no follow up care for their children, and 90.20% of the parents of the total group, responded that the purpose of the preschool hearing screening test was for the identification of hearing loss.

The data for question 2, regarding parental knowledge of their child's failing the preschool hearing test, showed that 94.85% of the parental group that sought follow up care for their children, 80% of the parental group that sought no follow up care for their children, and 94.12% of the total group responded that they had knowledge of their child's failing the preschool hearing test.

The data for question 3, regarding parental memory of what the technician told them at the time the child failed the preschool hearing screening test, showed a variety of responses. The 38 parents who inferred an awareness of the need for them to provide some kind of follow up care as the result of what the technician said

to them, did in fact provide for this need. In contrast to this, none of the parents of the group who provided no follow up care for their children indicated an awareness as the result of what the technician said to them of a condition that necessitated any follow up care.

The data for question 4, regarding the actions taken by the parents following their being informed by the technician of their child's failing the preschool hearing screening test, showed that the parents of 97 children, that is 95.10% of the 102 children in this study, sought follow up care for their children through their private physician, the public health otology clinic, or both.

The data for question 5, regarding parental contact by the public health nurse to follow up on the child's hearing loss, showed that only eight individual parental contacts were made by public health nurses. These contacts were all with parents in the group who sought follow up care for their children. There were no nurse contacts with the parental group who sought no follow up care for their children. None of the parents were contacted by school nurses regarding the follow up of their child's hearing failure.

The data for question 6a, regarding parental

knowledge of their child's hearing having been retested in kindergarten, showed that there was an awareness of the retest on the part of 72.16% of the parental group that had sought follow up for their children, 40% of the parental group that had not sought follow up for their children, and 70.58% of the total group in the study. These data were in contrast to the records of the St. Clair County Health Department which verify that 100 of the 102 children in the study, that is 98.04%, did have their hearing rescreened during the kindergarten year. The data for question 6b, regarding parental knowledge of whether their child had passed or failed the kindergarten rescreening, showed that the majority of the parents, 53.48% of the group that provided follow up and 66.67% of the group that did not provide follow up, responded that their child had passed the retest. Again, the data based upon the awareness and knowledge of parents were in contrast with the records of the St. Clair County Health Department that verified that 69 children (72.63%) of the parents who had sought follow up care for their children and four children (80%) of the parents who had sought no follow up care for their children, that is 73 children (73%) of the entire group retested in kindergarten, did in fact pass

their routine hearing rescreening during the kindergarten year.

The data for question 7, regarding the kind of medical coverage available to each child, showed that only five children were not covered by some form of medical insurance. All of these children were in the parental group in which follow up had been sought for their children. All the children in the parental group in which no follow up had been sought for their children were covered by some form of medical insurance.

The data for question 8, regarding the placement of the head of the house for each child in the study into one of Wechsler's occupational groups, were set forth for reference without assessment.

Summary of Findings Regarding the Hypothesis

A triad of certain responses to questions 1, 3 and 4 was identified as data supporting the general hypothesis, and as a means to measuring the effectiveness of the follow up procedures used with parents of preschool children who have failed their hearing screening. Using a formula including these certain responses, the effectiveness of the preschool hearing screening program in St. Clair County was 34.31%. Subhypothesis 1 was not supported,

as the data showed parental contact by nurses in regard to hearing screening follow up to have been 8.57%. Subhypothesis 2, also, was not supported, despite the data showing that 71.43% of the group of 35, whose actions support the general hypothesis, passed their routine hearing retest during the kindergarten year (1978-1979), as it was noted that four of the NC group (80%) also passed the same routine test.

Implications and Recommendations

The hypothesis was that the effectiveness of the follow up procedures used with parents depends upon the ability of parents to:

1. understand the purpose of the testing,
2. comprehend the technician's comments following the testing, and
3. initiate some action towards medical diagnosis or treatment of the hearing failure.

Regarding each of these three points, posed originally as questions, and with the data assembled, the following inferences were made:

1. The parents of the children who failed their preschool hearing screening test provided by the St. Clair County Health Department in the spring of 1978 did understand the purpose of the testing.

2. The effectiveness of the follow up by parents of the hearing loss did depend upon the ability of parents to comprehend the hearing technician's comments following the testing.
3. The effectiveness of the follow up by parents of the hearing loss did depend upon their ability to initiate some action towards medical diagnosis and treatment.

Some implications were developed through the study.

1. Parents whose preschool children were tested in the spring of 1978 in St. Clair County did understand the purpose of the preschool hearing screening program.
2. Generally, parents did know that their child had failed the preschool hearing screening program.
3. The parents remembered a variety of statements reportedly made by the technician at the time the child failed the test, with the majority not indicating an awareness that the technician was telling them that some form of action was needed to be initiated by them.

4. Most parents did, however, seek some form of follow up care for their children; if this was not initiated by the technician's comments, then the parents' actions towards follow up care must have been initiated by some other, undefined cause.
5. Parents sought follow up care for their children without involvement of public health or school nurses.
6. The parents' awareness of whether their children had been retested for hearing during the kindergarten year as well as knowledge about the results of the retest was inferior to the facts recorded by the St. Clair County Health Department.
7. Parents provided follow up care without concern for the existence or absence of medical coverage.

Several recommendations developing from the study were that:

1. the technician counsel parents to a greater extent regarding not only the hearing loss but also the need for them to initiate some action towards follow up;

2. more time be allowed per child during the preschool hearing screening program, to permit longer counselling time for the technician to talk to the parents;
3. a report be forwarded to the parents of every child retested indicating his passing or failing;
4. public health and/or school nurse involvement, though welcome, not be anticipated as a routine follow up procedure for children who fail their preschool hearing screening test; and
5. efforts to educate the public about hearing loss and hearing screening programs be continued by the St. Clair County Health Department, in cooperation with the Michigan Department of Public Health and local agencies and resources.

Suggestions for Further Research

The replication of this study in other counties of Michigan would produce data that would be useful in determining the universality of the findings in this study. Studies done in other states, provinces or nations would introduce variables that would make replication difficult. However, any study that can verify a positive role for parents in the follow up of any mass screening program or

public health concern would make a contribution. The dearth of literature regarding the role of parents in health screening or health care programs was cited. Studies undertaken to demonstrate a savings of public funds by more fully involving the parents in the follow up care of their children would also make contributions to the literature. The author would welcome inquiries and/or information about replications of the study.

Conclusion

Research was undertaken to evaluate the effectiveness of follow up procedures used in public health screening programs. Specifically, the research involved the follow up procedures initiated by parents of children who failed their preschool hearing screening test provided by the St. Clair County (Michigan) Health Department in the spring of 1978. Parental responses to a questionnaire confirmed that most parents understood that the purpose of the preschool hearing screening program was to identify hearing problems. Most initiated some follow up medical procedures regardless of the existence or absence of medical insurance coverage. Most, however, did not understand the technician when she counselled them that their children, having failed the

hearing screening, needed to have parent-initiated follow up care. Many did not know of the routine hearing retest during the kindergarten year, much less the results of that screening. The data have shown that most of the parents understood the reasons for the program, provided follow up care, and about 70% of the children passed the hearing retest in kindergarten.

The general hypothesis, however, of the study joined the concepts of parental understanding of the reasons for the program, parental initiation of some follow up procedures and the parental comprehension of the technician's comments following the testing. Because of lack of clear comprehension of the technician's comments on the part of many parents, the level of effectiveness of the preschool hearing screening program in St. Clair County, Michigan, was 35%.

If, then, the effectiveness of this public health mass screening program was only 35%, what influence can be credited for motivating about 95% of the parents towards initiating some kind of follow up care? From comments of the parents, the author concludes that the influence of over 20 years of public health screening in this county, with the support of education and the mass media, has

inculcated in the population of St. Clair County the concept of seeking follow up care when a health problem arises. Thus public health concepts have been converted into private health practice. The data found in this study confirmed that most parents interviewed play an informed role in the follow up care of their children. The implementation of the recommendations suggested in this chapter should improve the effectiveness of the public health hearing screening program while supporting the parents' role in providing follow up care, with the result being healthier children.

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APPENDIX I: Personal Communication from Peter T. Mallery, Senior Planner, St. Clair County Metropolitan Planning Commission, October 3, 1979 (typed from handwritten memo)

Question: To what extent can St. Clair County be considered a micro-image of the State of Michigan; particularly with respect to urban/rural mix.

In the 1970 Census, 73.8% of the State of Michigan's population was classified as urban compared to 46% for St. Clair County. By these figures alone, the State as a whole is somewhat more urbanized than St. Clair County--roughly 70% vrs. 50%.

However, if the Census definition of urban and rural residence is examined more closely, it can be shown that modifying the census criteria of "urban" to include the unincorporated Townships of 2,500 inhabitants or more, would raise St. Clair County's percent urban to 76.7%.

No attempt has been made to see what a similar modification of criteria would do to the State's percentage, but we assume the rise would be much less.
(see enclosures following)

Enclosure 1:

Total Population St. Clair County, Mich. 1970 Census:

120,175.

1970 Census Definition of "Urban" - (Incorporated places - cities & villages - of 2,500 inhabitants or more).

Algonac City	2,684
Marine City	4,567
Marysville City	5,610
Port Huron City	35,794
St. Clair City	4,770
City of New Baltimore (part)	895
total urban	55,320 (46.0%)

Tutal Places of 1,000 - 2,500

Capac Village	1,279
Yale City	1,505
City of Memphis (part)	372
Sparlingville	1,845
Pearl Beach	1,744
total rural places	6,745

Unincorporated Townships of 2,500 inhabitants or more

Clay Twp.	6,372
Clyde Twp.	2,980
Fort Gratiot Twp.	7,075
Ira Twp.	3,612
Kimball Twp.	6,152
Port Huron Twp.	7,635
St. Clair Twp.	
Total "suburban" Townships	36,917 (30.7%)

(unsigned)

Table 9. Population and Land Area of Counties: 1970 and 1960

[For meaning of symbols, see text]

Urban and Rural	Land area in square miles, 1970	1970 population									1960 population			Percent change, 1960 to 1970		
		Total		Urban				Rural								
		Number	Per square mile	Total	Percent of total	Urbanized area	Other urban	Total	Places of 1,000 to 2,500	Other rural	Total	Urban	Rural	Total	Urban	Rural
The State	56,817	8,875,083	156.2	6,363,773	73.6	5,650,943	884,930	2,321,310	347,370	2,073,940	7,823,194	6,738,122	2,084,962	13.6	14.2	11.4
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
St. Clair	724	129,173	183.7	83,320	46.0	-	83,320	64,853	4,745	60,110	107,201	53,884	54,138	18.1	4.2	19.8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13.9	0.0	19.9
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	...	0.0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.1	-11.3	-4.3
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15.0	0.0	20.7
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13.3	4.7	13.5
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	16.1	33.1	12.1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	36.0	80.0	0.3
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	0.0	-39.4
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	-1.3	16.4

Table 10. Population of County Subdivisions: 1970 and 1960—Continued

[Total population of a place in two or more county subdivisions appears in Table 6. County subdivision figures for 1960 do not necessarily add to county totals. For meaning of symbols, see text]

County Subdivisions	1970	1960	Percent change
St. Clair County	129,175	107,201	13.1
Algonac city[23]	3,884	3,190	15.8
Berlin township	1,595	1,418	13.3
Brockway township[23]	906	948	8.8
Burtchville township	3,027	1,726	10.0
Casco township	3,985	1,863	10.6
China township	3,106	1,636	14.7
Clay township[23]	6,372	6,948	-8.3
Pearl Beach (U)	1,744	1,234	43.5
Clyde township	2,960	1,888	56.8
Columbus township	1,537	1,518	27.6
Cottrellville township[23]	3,194	1,834	19.6
East China township	3,129	1,374	33.7
Emmett township	1,387	1,084	31.0
Emmett village	397	383	4.8
Fort Gratiot township[23]	7,873	5,588	36.8
Grant township	833	708	17.5
Greenwood township	899	847	8.8
Ira township	3,812	2,746	31.5
Kenockee township	1,350	1,368	-1.4
Kimball township	8,133	8,268	-1.8
Sperlingville (U)	1,845	1,877	-1.7
Lynn township	787	751	3.1
Marine City city[23]	4,387	4,484	3.7
Marysville city	5,810	8,883	34.8
Memphis city (part)	372	348	6.9
Musey township	3,449	3,393	2.8
Capac village	1,379	1,230	2.8
New Baltimore city (part)	895	784	14.2
Port Huron city[23]	33,794	36,084	-6.8
Port Huron township[23]	7,635	7,017	8.3
Riley township	1,536	1,288	20.1
St. Clair city	4,770	4,538	5.1
St. Clair township	3,081	2,416	27.9
Wales township	1,978	1,619	19.5
Yale city[23]	1,888	1,631	-7.2

MICHIGAN 24-31

U.S. DEPARTMENT OF COMMERCE
Maurice H. Stans, Secretary
James T. Lynn, Under Secretary
Harold C. Passer, Assistant Secretary for Economic Affairs

BUREAU OF THE CENSUS
George Hay Brown, Director
Conrad Taeuber, Associate Director
David L. Kaplan, 1970 Census Coordina

POPULATION DIVISION
Herman P. Miller, Chief

ST. CLAIR COUNTY
METROPOLITAN PLANNING
COMMISSION

Peter T. Mallery, A.I.P.
Senior Planner

511 Fort St., Suite 400
Port Huron, Mich. 48060
Phone (313) 987-4884

Enclosure 3 - APPENDIX I

INTRODUCTION—Continued

by the census enumerators. Persons without a usual place of residence were, however, counted where they were enumerated.

Members of the Armed Forces living on military installations were counted as residents of the area in which the installation was located. Members of the Armed Forces not living on a military installation were counted as residents of the area in which they were living. Crews of U.S. Navy vessels were counted as residents of the home port to which the particular vessel was assigned; crews of vessels deployed to the overseas fleet were therefore not included in the population of any State or the District of Columbia. Persons in Armed Forces families were counted where they were living on Census Day (e.g., the military installation, "off-base," or elsewhere, as the case might be). Crews of U.S. merchant marine vessels were counted as part of the population of the U.S. port in which their vessel was berthed on Census Day; or if sailing in inland or coastal waters, either the port of departure or destination, depending on which the vessel was nearest on Census Day. Crews of all other U.S. merchant marine vessels are not included in the population of any State or the District of Columbia.

College students, as in 1950 and 1960, were counted as residents of the area in which they were living while attending college. Inmates of institutions, who ordinarily live there for considerable periods of time, were counted as residents of the area where this institution was located; on the other hand, patients in general hospitals, who ordinarily remain for short periods of time, were counted at their homes. On the night of April 6, 1970, a special enumeration was performed in missions, flophouses, detention centers, etc., and persons enumerated therein were counted as residents of the particular place.

Americans who were overseas for an extended period (in the Armed Forces, working at civilian jobs, studying in foreign universities, etc.) are not included in the population of any of the States or the District of Columbia. On the other hand, persons temporarily abroad on vacations, business trips, and the like, were counted at their usual residence.

Persons in larger hotels, motels, etc., on the night of March 31, 1970, were requested to fill out a census form for allocation back to their homes if they indicated no one was there to report them in the census. A similar approach was used for Americans who left the United States during March 1970 via major intercontinental air or ship carriers for temporary travel abroad. Persons visiting in private homes who gave this kind of indication were also allocated back to their usual residence.

In addition, information on persons away from their usual place of residence was obtained from other members of their families, landladies, etc. If an entire family was expected to be away during the whole period of the enumeration, information on it was obtained from neighbors. A matching process was used to eliminate duplicate reports for a person who reported for himself while away from his usual residence and who was also reported at his usual residence by someone else.

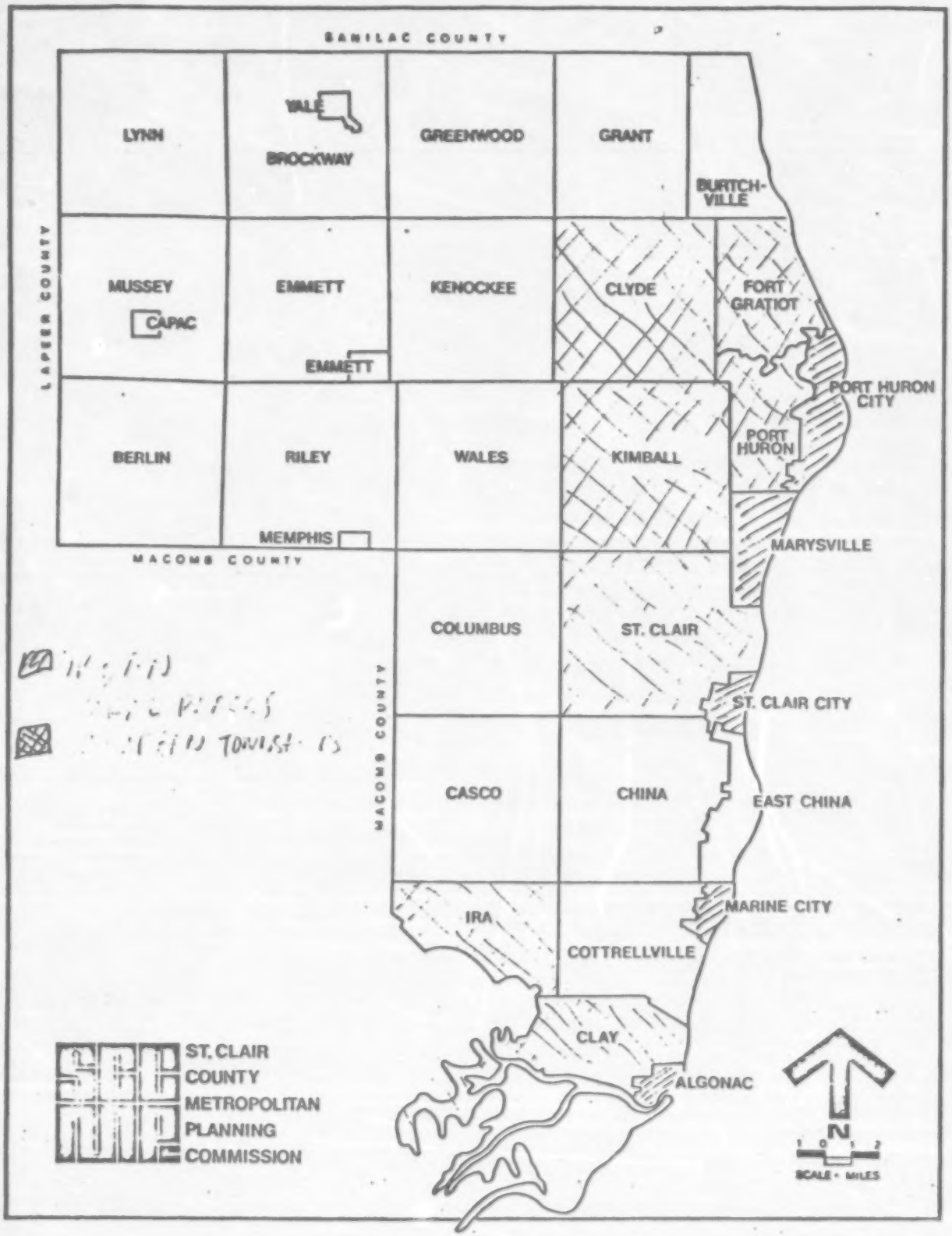
URBAN AND RURAL RESIDENCE

Data on the population of the State by urban and rural residence are shown for the State in table 1 and for the counties, or comparable areas, in table 9. According to the definition adopted for use in the 1970 census, the urban population comprises all persons living in urbanized areas and in places of 2,500 inhabitants or more outside urbanized areas. More specifically, the urban population consists of all persons living in (a) places of 2,500 inhabitants or more incorporated as cities, villages, boroughs (except Alaska), and towns (except in the New England States, New York, and Wisconsin), but excluding those persons living in the rural portions of extended cities; (b) unincorporated places of 2,500 inhabitants or more; and (c) other territory, incorporated or unincorporated, included in urbanized areas.

In censuses prior to 1950, the urban population comprised all persons living in incorporated places of 2,500 or more and areas (usually minor civil divisions) classified as urban under special rules relating to population size and density. The most important component of the urban territory in any definition is the group of incorporated places having 2,500 inhabitants or more. A definition of urban territory restricted to such places, however, would exclude a number of large and densely settled places merely because they are not incorporated. Prior to 1950, an effort was made to avoid some of the more obvious omissions by inclusion of selected places which were classified as urban under special rules. Even with these rules, however, many large and closely built-up places were excluded from the urban territory.

To improve its measure of the urban population, the Bureau of the Census adopted, in 1950, the concept of the urbanized area and delineated, in advance of enumeration, boundaries for unincorporated places. With the adoption of the urbanized area and unincorporated place concepts for the 1950 census, the urban population was defined as all persons residing in urbanized areas and, outside these areas, in all places incorporated or unincorporated, which had 2,500 inhabitants or more. With the following two exceptions, the 1950 definition of urban was continued substantially unchanged to 1960 and 1970. In 1960 (but not in 1970), certain towns in the New England States, townships in New Jersey and Pennsylvania, and counties elsewhere were designated as urban. However, most of the population of these "special rule" areas would have been classified as urban in any event because they were residents of an urbanized area or an unincorporated place of 2,500 or more. Second, the introduction of the concept of "extended cities" in 1970 has very little impact on the urban and rural figures generally.

In all urban and rural definitions, the population not classified as urban constitutes the rural population.


SANILAC COUNTY
LYNN
YALE
BROCKWAY
GREENWOOD
GRANT
BURTCH-VILLE
LAPEER COUNTY
MUSSEY
CAPAC
EMMETT
EMMETT
KENOCKEE
CLYDE
FORT GRATIOT
PORT HURON CITY
BERLIN
RILEY
MEMPHIS
WALES
KIMBALL
PORT HURON
MARYSVILLE
MACOMB COUNTY
COLUMBUS
ST. CLAIR
ST. CLAIR CITY
MACOMB COUNTY
CASCO
CHINA
EAST CHINA
IRA
MARINE CITY
COTTRELLVILLE
CLAY
ALGONAC
ST. CLAIR COUNTY METROPOLITAN PLANNING COMMISSION
N
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SCALE - MILES

APPENDIX II: Parental Responses to Question 3 as Recorded at Time of Interview, Including General Answer Placement

Question 3. What did the hearing technician tell you?

Number of respondents C/97

Respondent Number		Placed in General Answer
C01	the child will be tested in kindergarten	1
C02	the child had a problem with hearing	2
C03	take the child to a doctor	3
C04	the child wasn't hearing (too well)	2
C05	according to the test, the child didn't hear one thing	2
C06	the child wasn't scoring with one of his ears; he couldn't hear	2
C07	one ear not hearing	2
C08	the child didn't do well	9
C09	there would be follow up testing through the schools	1
C10	the child's hearing was borderline	9
C11	the child wasn't hearing too well	9

C12	one tone was missing	9
C13	if hearing doesn't get better, medical attention may be necessary	3
C14	the child flunked the hearing test and should come to clinic for another test	4
C15	the child should be checked by a specialist	3
C16	the child was not hearing in the left ear	2
C17	the child failed test and should be seen by a doctor	5
C18	the child failed test and should be seen by a doctor	5
C19	the child did not hear	2
C20	the child failed the test and needed to see a doctor	5
C21	the child wasn't hearing as he should and should be evaluated further	4
C22	the child's hearing wasn't up to normal and the child should go to the otology clinic	5
C23	the child's hearing was down (30%)	2
C24	the technician confirmed the hearing loss which the parents already knew existed	8
C25	the child had water on his eardrum	7
C26	I can't remember	11

C27	the technician expressed a concern for the child's speech	10
C28	the child had a 30% hearing loss	2
C29	the child should attend the otology clinic	3
C30	the child should attend the otology clinic	3
C31	the child should return to pediatrician	3
C32	the child didn't pass test	2
C33	the child didn't fail test	10
C34	I don't remember	11
C35	the child had a conductive loss and needed medical follow up	5
C36	I don't remember	11
C37	the child had a problem hearing and the local health department would get in touch with the mother	5
C38	the child hadn't done well on test	9
C39	the technician wasn't sure, but that child should be retested	4
C40	the technician confirmed loss already suspected by mother because of a cold	8
C41	something was wrong with one ear	2

C42	the technician asked if child had a cold and said that the child should be checked by a doctor	3
C43	the technician knew the child wasn't hearing	2
C44	the child's hearing needed to be checked further	4
C45	the child had a 30% loss in the high frequencies	2
C46	the child had no hearing in the left ear	2
C47	the technician suggested follow up through the otology clinic or family physician	3
C48	the child didn't hear too good [sic] with his right ear	2
C49	the technician said something to do with high frequenty	9
C50	the technician found the child had a problem	9
C51	the technician said the child had impaired hearing	2
C52	the technician didn't know what the problem was	10
C53	I can't remember	11
C54	the technician felt child was scared and didn't understand test	10
C55	I don't remember	11

C56	the technician confirmed what mother already knew	8
C57	the technician said hearing loss might be caused by adenoids	7
C58	the child should see a doctor	3
C59	the technician confirmed hearing loss already known to parents	4
C60	the child wasn't hearing too well	9
C61	the technician said further testing was needed	4
C62	the hearing was below normal	9
C63	I don't know	12
C64	the technician said ears might be plugged with wax	7
C65	the technician said that the child didn't do well	7
C66	the technician said the child should be checked by doctor	3
C67	the technician confirmed what mother already knew	8
C68	the child had a little loss	9
C69	the child couldn't hear out of the right ear	2
C70	the technician suspected fluid in the child's ears	7
C71	the technician confirmed what the mother already knew	8

C72	the technician asked about ear infections	7
C73	the technician said the child couldn't hear high-pitched sounds	9
C74	the technician confirmed what parents already knew	8
C75	the technician confirmed what parents already knew	8
C76	the child wasn't paying attention or had a cold	6
C77	the technician confirmed what mother suspected might be the problem	8
C78	the technician said the child had congestion in the ear	7
C79	the technician couldn't get a good test	6
C80	the technician said the child was anticipating sounds but didn't hear well in the ear that was infected	9
C81	the test confirmed what the parents knew	8
C82	the child was way below par; grandmother had suspected loss	8
C83	the child wasn't hearing well out of one ear	2
C84	the child was a little hard-of-hearing	9
C85	the technician confirmed what mother already suspected	8

C86	the test confirmed what mother already knew	8
C87	I don't remember	11
C88	the technician talked to father; mother was not surprised to hear of child's hearing loss	8
C89	the technician said testing conditions were not good and that the child seemed to have trouble paying attention	6
C90	the child's hearing was down 30%	2
C91	the child's left ear was not doing well on test; mother wasn't surprised	2
C92	the child should come to the health department for a further test	4
C93	the child had a slight hearing loss in the right ear	2
C94	the child should come to otology clinic	3
C95	the child wasn't picking up low sounds	9
C96	the child was having problems with the ears	9
C97	the test confirmed a known loss	8

Number of respondents NC 5

Respondent Number		Placed in General Answer
NC01	the child could have blockage from a cold	7
NC02	the technician said to be sure to have the child tested next year	1
NC03	the technician didn't know if loss was due to cold or fractured skull (age two)	7
NC04	the technician said nothing special	10
NC05	I don't remember	11

APPENDIX III: Parental Responses to Question 5b as Recorded on Questionnaire

Question 5b. What did she (i.e., the school/public health nurse) say?

Respondent C14: She came to check if the child's ears were better.

Respondent C19: She came to find out how the child's hearing was improving.

Respondent C37: She came to question what had happened.

Respondent C42: She came to check out the child's medication and medical follow up.

Respondent C43: She asked if hearing problem had been corrected.

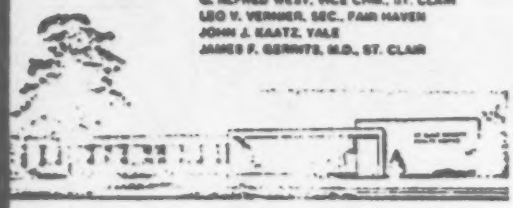
Respondent C56: She checked up on child's medical care.

Respondent C72: She came to find out what had happened.

Respondent C84: She came to follow up on what had happened.

APPENDIX IV

BOARD OF HEALTH
ELMER H. KERSTEN, CHM., MARINE CITY
G. ALFRED WEST, VICE CHM., ST. CLAIR
LEO V. VERNIER, SEC., FAIR HAVEN
JOHN J. KAATZ, YALE
JAMES F. GERRITS, M.D., ST. CLAIR



ALGONAC BRANCH 794-9327
COURT REFERRAL 982-9517
MEDICAID SCREENING 984-3894
W. I. C. PROGRAM 987-8222
LABORATORY 987-6306
DENTAL PROGRAM 984-5197
ENVIRONMENTAL HEALTH 987-6306
FAMILY PLANNING 987-6300

st. clair county health department

166 McMORRAN BOULEVARD - PORT HURON, MICHIGAN 48060 - OFFICE 987-6300

October 30, 1979

R. Philip Groh, Jr.
Regional Audiology and Speech Pathology
Consultant, M.D.P.H.
1895 N. Perry
Pontiac, Michigan - 48055

Dear Mr. Groh:

In response to your inquiry regarding the priorities for field work by the public health nurses of the St. Clair County Health Department, let me say that the following suggested list of priorities is generally used by our nursing staff:

First priority:	home health care patients
Second priority:	tuberculosis patients
Third priority:	patients with other communicable diseases
Fourth priority:	High risk infants/maternity
Fifth priority:	chronic health care patients, including children who fail their hearing screening tests

I trust that this information will be helpful to you.

Sincerely,

ST. CLAIR COUNTY HEALTH DEPARTMENT
Jon B. Parsons, M.P.H.
Director, Health Officer

BY: Alice Kerna, R.N.,B.S.,M.P.H.
Director of Nursing

AK/ct

APPENDIX V.

Sample Follow Up Study Cover Page

Subject No. _____ Date of Interview _____

Child's name _____ b.d. _____

Respondent

Father's name _____ _____

Mother's name _____ _____

Address _____ tel. no. _____

_____ zip _____

I/We permit the release of pertinent information from this questionnaire and from the St. Clair County Health Department to be used by Mr. R. Philip Groh, Jr., in his doctoral research for The University of Sarasota.

_____

Parent's Signature

APPENDIX VI. Sample Data Recording Form

Group: Follow up _____
or No Follow up _____

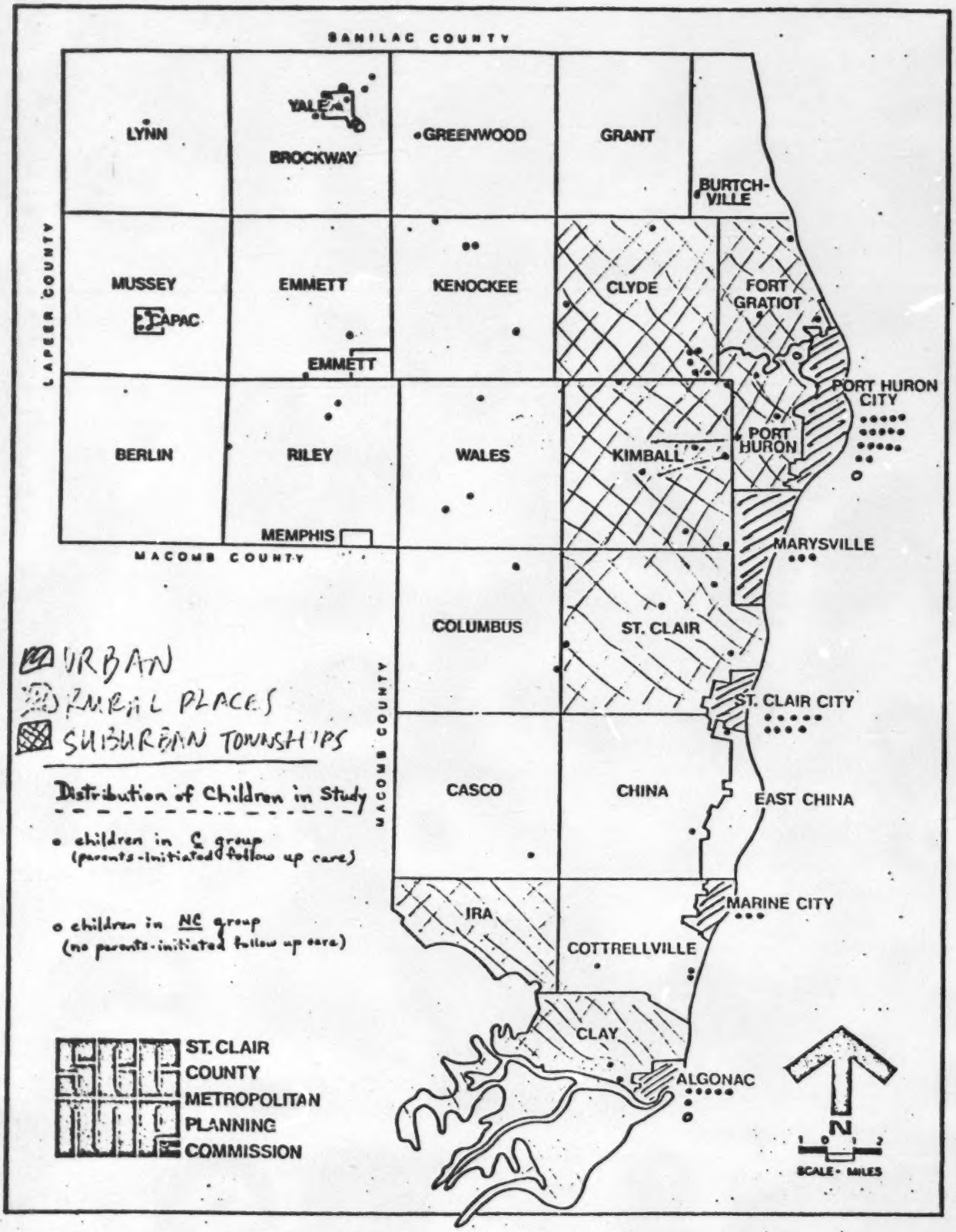
subject #	01	02	03	04	and so on
Q.1.a.					
b.					
c.*					
2.yes					
no					
3.*					
4.a.					
b.					
c.					
d.*					
5.a. yes					
no					
b.*					
6.a. yes					
no					
b. p.					
f.					
dk.					
7.a.					
b.					
c.					
d.*					
e.					
8.a.					
b.					
c.					
d.					
e.					

*1.c. Specify:

*4.d. Specify:

*3. Technician's Comments:

*6.b. Nurse's Comments


SANILAC COUNTY
LYNN
YALE
BROCKWAY
GREENWOOD
GRANT
BURTCH-VILLE
LAPEER COUNTY
MUSSEY
CAPAC
EMMETT
EMMETT
KENOCKEE
CLYDE
FORT GRATIOT
PORT HURON CITY
BERLIN
RILEY
WALES
KIMBALL
PORT HURON
MEMPHIS
MARYSVILLE
MACOMB COUNTY
COLUMBUS
ST. CLAIR
URBAN
RURAL PLACES
SUBURBAN TOWNSHIPS
ST. CLAIR CITY
MACOMB COUNTY
Distribution of Children in Study
CASCO
CHINA
EAST CHINA
• children in C group (parents-initiated follow up care)
o children in NC group (no parents-initiated follow up care)
IRA
MARINE CITY
COTTRELLVILLE
CLAY
ALGONAC
ST. CLAIR COUNTY METROPOLITAN PLANNING COMMISSION
N
1 0 1 2
SCALE - MILES

VITA

R(aymond) Philip Groh, Jr.
687 Huntington Drive
Mount Clemens, Michigan 48043
(313) 465-1870
Social Security No. 122-22-8262

I. Personal:

Age - 49 (birthdate 5/18/30; Buffalo, New York)

Married, three children (ages 20, 18 and 16)

II. Education:

A. elementary and secondary, Buffalo (N.Y.) Public Schools: Regents High School diploma, June 1948.
State University of New York, College for Teachers, Buffalo: B.Sc. in Education, June 1952; majors - elementary education and speech correction.
University of Wisconsin, Madison: M.Sc. (Speech), June 1956.
Wayne State University, Detroit: Education Specialist Certificate in Special Education and Vocational Rehabilitation, June 1964.
University of Sarasota, Sarasota, Florida: Ed.D., January 1980.

B. Workshops and Extension Courses:

School Finance, Michigan State University, Fall 1966.
Orthotic and Prosthetic Clinic, Northwestern University, Chicago, September 1968.
Workshop on Consultation, Case-Western Reserve University, Cleveland, July 1969.
Region V (HEW) Conference on the Education and Rehabilitation of the Deaf, at Cincinnati, University of Cincinnati, March 1970.
Impedance Workshop, Madsen Corp., Memphis, Tenn., February 1973.
Impedance Workshop, Electromedics Corp., Southfield, Michigan; March 1979.

III. Employment:

DATES: June 1971 to present
TITLE: Audiology and Speech Pathology Consultant 12
EMPLOYER: Michigan Department of Public Health
Hearing and Speech Section
Lansing, Michigan

DATES: March 1968 to June 1971
TITLE: Vocational Rehabilitation Agent 09, 10 and 11
EMPLOYER: State Department of Education
Division of Vocational Rehabilitation
Mount Clemens, Michigan

DATES: November 1966 to March 1968
TITLE: Rehabilitation Counsellor and Speech Therapist
EMPLOYER: Goodwill Industries of Greater Detroit
(now part of League-Goodwill of Detroit)
Detroit, Michigan

DATES: September 1960 to October 1966
TITLE: Speech Therapist
EMPLOYER: Warren Woods Public Schools
Warren, Michigan

DATES: September 1956 to June 1960
TITLE: Speech Therapist
EMPLOYER: Mount Clemens Community Schools
Mount Clemens, Michigan

DATES: September 1955 to June 1956
TITLE: Clinical Assistant, Speech and Hearing Clinic
EMPLOYER: University of Wisconsin
Madison, Wisconsin

DATES: June 1961 to August 1961
TITLE: Assistant Director
Aphasia Speech Clinic
EMPLOYER: University of Wisconsin
Madison, Wisconsin

DATES: May 1952 to March 1955
TITLE: Instructor, English and Linguistics
EMPLOYER: Tohoku Gakuin
Sendai, Miyagi, Japan

DATES: April 1957 to July 1979
EMPLOYER: Private Practice
Medi-Speech Service
Mount Clemens, Michigan

IV. Certificates, Memberships and Miscellaneous:

A. Certificates:

1. Teaching:

Michigan - Permanent Secondary for speech therapy, K-12; all subjects, 7-8; English, Social Studies, 9-12.
Wisconsin - Speech Therapy, all grades.
Kansas - Speech Correction, all grades.
New York - Speech Therapy, K-12; all subjects, K-8.

2. Certificate of Clinical Competency - Speech Pathology from the American Speech & Hearing Association.

B. Memberships:

National, state and local speech-language-hearing associations
National and state rehabilitation associations
Michigan Public Health Association
Michigan State Employee's Association
Mount Clemens Rotary Club
National and State Huguenot societies

C. Miscellaneous:

Notary Public, Macomb County (expires 3/9/83)
Ability to communicate in German, Japanese, Danish, Efik and the Language of Signs has been useful.
Other Interests - genealogy, music, bridge, travel, history.

D. Past President:
Macomb County Speech and Hearing Association - 2 terms
Macomb-St. Clair Counties Speech & Hearing Association - 1 term
Zion United Church of Christ, Mount Clemens - 1 term
United Ministries in Higher Education, Oakland University - 1 term
Warren Woods Health Council - 2 terms
B.S.A. Troop #94, Clinton Valley Council - 2 terms
Mount Clemens Community Schools Band and Orchestra Boosters - 2 terms
Mount Clemens Civic Chorus - 2 terms

E. Member, Board of Directors:
Health Manpower Action Council, MPHA - 4 years
Honors and Awards Committee, MPHA 5 years (Chairperson, 1979-1980)
Community Health Division, MPHA - 4 years
Zion United Church of Christ, Mount Clemens - 4 years
United Ministries in Higher Education, Oakland University - 10 years
B.S.A. Troop and Pack #94, Clinton Valley Council - 8 years
Huguenot Society of Michigan - 2 years
Congressional Action Contact, American Speech-Language-Hearing Association, for District 12-Michigan - 9 years
Warren Woods Health Council - 6 years
Mount Clemens Civic Chorus - 7 years